1874MNRAS..34..416.

Observations of Occultations of Stars by the Moon, 1873 *and* 1874, *(with the deduced Equations between the Errors of the Lunar Elements); and of Phenomena of Jupiter's Satellites in* 1874: *made at the Radcliffe Observatory, Oxford.*

(*Communicated by the Radcliffe Observer.*)

Occultations.

No.	Day of Observation.	Phenomenon.	Moon's Limb.	Oxford Mean Solar Time.	Observer.
	1873.			h m s	
1	July 4	Dis. of λ Virginis	Dark	10 9 9·3	M & K
2	Oct. 3	„ τ^1 Aquarii	„	6 26 22·5	K
3	Nov. 5	„ A^1 Tauri	Bright	11 56 57·1	L
4	Dec. 24	„ τ^2 Aquarii	Dark	4 24 34·3	M & K
	1874.				
5	Jan. 25	Dis. of 53 Arietis	Dark	11 43 46·9	K
6	„ 26	„ A^1 Tauri	„	12 30 20·9	L
7	„ 27	„ *k* Tauri	„	10 34 13·0	K
8	„ 30	„ *c* Geminorum	„	6 0 16·1	K
9	Mar. 26	„ λ Cancri	„	11 41 34·6	K
10	Apr. 22	„ ω^1 Cancri	„	9 39 35·7	K
11	„	„ ω^2 Cancri	„	10 6 20·0	M & K

Notes.

1873. July 4. The disappearance was instantaneous and the observation good. The mean of the observed seconds 9·0 and 9·5 has been taken.
Oct. 3. The observation good.
Nov. 5. The Moon and star rather unsteady; thin cloud.
Dec. 24. Very exact (M.). Very good (K.). The mean of the observed seconds 34·5 and 34·2 has been taken.
1874. Jan. 25, Jan. 26, Jan. 27, Jan. 30, Mar. 26. The disappearances were instantaneous and the observations good.
Apr. 22. (Disapp. of ω^2 *Cancri.*) Very good (M.). The mean of the observed seconds 19·8 and 20·2 has been taken.
„ (Disapp. of ω^1 and ω^2 *Cancri.*) Disappearances instantaneous and the observations good (K.).

In the following table of the errors of lunar elements resulting from the occultations the Greenwich notation is used, and the elements of the *Nautical Almanac* are used uncorrected. All the computations have been made by Mr. Main by the method given in his treatise on *Spherical and Practical Astronomy.*

The observations are referred to by the Nos. of reference given above.

$$1, \quad +\overset{\prime\prime}{6\cdot42} = +0\cdot378\times e + 0\cdot922\times f - 0\cdot378\times x - 0\cdot923\times y - 0\cdot320\times t - 2\cdot144\times m - 0\cdot916\times n.$$

1874MNRAS..34..416.

$$2,\quad + \overset{\prime\prime}{9}{\cdot}48 = + 0{\cdot}960 \times e - 0{\cdot}151 \times f - 0{\cdot}960 \times x + 0{\cdot}150 \times y - 0{\cdot}494 \times t - 1{\cdot}272 \times m - 0{\cdot}996 \times n.$$

$$3,\quad + 4{\cdot}38 = + 0{\cdot}146 \times e - 0{\cdot}988 \times f - 0{\cdot}146 \times x + 0{\cdot}988 \times y - 0{\cdot}248 \times t + 1{\cdot}675 \times m - 0{\cdot}967 \times n.$$

$$4,\quad + 8{\cdot}97 = + 0{\cdot}973 \times e + 0{\cdot}016 \times f - 0{\cdot}973 \times x - 0{\cdot}018 \times y - 0{\cdot}374 \times t - 0{\cdot}104 \times m - 0{\cdot}971 \times n.$$

$$5,\quad + 8{\cdot}73 = + 0{\cdot}578 \times e - 0{\cdot}794 \times f - 0{\cdot}578 \times x + 0{\cdot}794 \times y - 0{\cdot}427 \times t + 3{\cdot}223 \times m - 0{\cdot}954 \times n.$$

$$6,\quad + 8{\cdot}47 = + 0{\cdot}924 \times e + 0{\cdot}052 \times f - 0{\cdot}924 \times x - 0{\cdot}051 \times y - 0{\cdot}491 \times t + 1{\cdot}948 \times m - 0{\cdot}945 \times n.$$

$$7,\quad + 8{\cdot}77 = + 0{\cdot}899 \times e - 0{\cdot}104 \times f - 0{\cdot}899 \times x + 0{\cdot}107 \times y - 0{\cdot}416 \times t + 1{\cdot}328 \times m - 0{\cdot}937 \times n.$$

$$8,\quad + 5{\cdot}50 = + 0{\cdot}657 \times e - 0{\cdot}678 \times f - 0{\cdot}657 \times x + 0{\cdot}679 \times y - 0{\cdot}353 \times t - 0{\cdot}045 \times m - 0{\cdot}915 \times n.$$

$$9,\quad + 6{\cdot}15 = + 0{\cdot}367 \times e + 0{\cdot}914 \times f - 0{\cdot}367 \times x - 0{\cdot}914 \times y - 0{\cdot}319 \times t - 1{\cdot}035 \times m - 0{\cdot}908 \times n.$$

$$10,\quad + 7{\cdot}83 = + 0{\cdot}825 \times e - 0{\cdot}392 \times f - 0{\cdot}825 \times x + 0{\cdot}394 \times y - 0{\cdot}345 \times t + 2{\cdot}361 \times m - 0{\cdot}922 \times n.$$

$$11,\quad + 6{\cdot}30 = + 0{\cdot}766 \times e + 0{\cdot}524 \times f - 0{\cdot}766 \times x - 0{\cdot}522 \times y - 0{\cdot}469 \times t + 0{\cdot}562 \times m - 0{\cdot}922 \times n.$$

Phenomena of Jupiter's Satellites.

Day of Obs.	Satellite.	Phenomena.	Instrument and Power used.	Oxford Mean Solar Time of Observation.	Greenwich Mean Solar Time from N. A.	Observer.
1874.				h m s	h m s	
Jan. 30.	I.	Tr. egr. bisection	Heliom.	11 45 4·6	11 51	B
		,, last contact	with power 150	11 46 49·3		
	IV.	Ecl. disappearance	,,	12 23 23·6	12 32 10·0	K
Mar. 7.	III.	Ecl. disappearance	,,	10 23 24·0	10 24 23·0	,,
,, 9.	II.	Occ. reap. first app.	10-ft. tel.	11 7 32·4	11 14	,,
		,, last contact	with power 150	11 12 31·6		
	I.	Occ. reap. bisection	,,	12 12 51·9	12 18	,,
		,, last contact	,,	12 14 51·6		
,, 18.	II.	Tr. egr. first contact	Heliom.	7 55 59·0	8 4	,,
		,, bisection	with power 200	7 57 58·7		
		,, last contact	,,	8 0 28·2		

1874MNRAS..34..416.

Day of Obs.	Satellite.	Phenomena.	Instrument and Power used.	Oxford Mean Solar Time of Observation.			Greenwich Mean Solar Time from N.A.			Obser-ver.
1874.				h	m	s	h	m	s	
	I.	Occ. reap. first app.	Heliom. with power 200	8	20	54·8	8	28		K
		,, bisection		8	22	24·6				
		,, last contact		8	24	24·3				
Mar. 24.	I.	Tr. ingr. first contact	10-ft. tel.	10	34	1·3	10	43		L
		,, last contact	with power 150	10	39	10·4				
		,, first contact	Heliom.	10	33	8·2	10	43		B
		,, bisection	with power 200	10	35	17·8				
		,, last contact	,,	10	38	47·2				
,, 25.	III.	Tr. ingr. first contact	,,	7	11	25·7	7	21		K
		,, bisection	,,	7	14	55·1				
		,, last contact	,,	7	19	24·5				
	II.	,, first contact	,,	7	34	22·0	7	41		,,
		,, bisection	,,	7	37	21·5				
		,, last contact	,,	7	40	36·0				
	I.	Occ. disap. first contact	,,	7	48	49·6	7	56		,,
		,, bisection	,,	7	50	49·3				
		,, last contact	,,	7	52	49·0				
	II.	Tr. egr. first contact	,,	10	7	56·8	10	17		,,
		,, bisection	,,	10	10	26·4				
		,, last contact	,,	10	13	25·9				
	III.	Tr. egr. first contact	,,	10	7	56·9	10	22		,,
		,, bisection	,,	10	11	56·2				
		,, last contact	,,	10	15	55·5				
	I.	Ecl. reap. first seen	,,	10	16	10·5	10	21	2·5	,,
		,, full brightness	,,	10	19	24·9				
	II.	Sh. egr. first contact	,,	10	30	23·1	10	43		,,
	III.	Sh. egr. first contact	,,	11	1	48·0	11	15		,,
		,, bisection	,,	11	5	47·3				
		,, last contact	,,	11	8	46·8				
,, 26.	I.	Tr. egr. first contact	,,	7	16	28·6	7	24		,,
		,, bisection	,,	7	18	28·3				
		,, last contact	,,	7	20	28·0				
,, 31.	I.	Tr. ingr. first contact	10-ft. tel.	12	20	25·0	12	27		L
		,, bisection	with power 150	12	22	24·7				
		,, last contact	,,	12	25	4·3				

1874MNRAS..34..416.

Day of Obs. 1874.	Satellite.	Phenomena.	Instrument and Power used.	Oxford Mean Solar Time of Observation. h m s	Greenwich Mean Solar Time from N.A. h m s	Observer.
	I.	Sh. ingr. last contact	10-ft. tel.	12 47 0·7	12 47	L
Apr. 8.	I.	Occ. dis. first contact	with power 150	11 17 14·0	11 24	,,
		,, bisection		11 19 23·7		
		,, last contact	,,	11 20 43·5		
	II.	Tr. ingr. first contact	,,	12 2 13·1	12 8	,,
		,, bisection	,,	12 5 12·6		
		,, last contact	,,	12 9 31·9		
,, 10.	I.	Ecl. reappearance	,,	8 32 20·2	8 37 26·0	,,
	II.	Ecl. reap. first seen	,,	10 30 2·3	10 36 15·4	,,
		,, fully seen	,,	10 30 22·3		
	I.	Ecl. reappearance	Heliom.	8 32 20·2	8 37 26·0	B
	II.	Ecl. reappearance	with power 200	10 30 2·3	10 36 15·4	,,
,, 24.	I.	Occ. dis. first contact	10-ft. tel.	9 14 51·2	9 22	L
		,, last contact	with power 150	9 19 30·4		
	II.	Occ. dis. first contact	,,	11 21 18·9	11 30	,,
		,, last contact	,,	11 25 58·1		
,, 25.	I.	Tr. egr. first contact	Heliom.	8 43 36·3	8 55	K
		,, bisection	with power 200	8 45 36·0		
		,, last contact	,,	8 48 35·5		
May 2.	I.	Tr. ingr. first contact	,,	8 19 42·4	8 26	B
		,, bisection	,,	8 22 12·0		
		,, last contact	,,	8 25 41·4		
	I.	Sh. ingr. first seen	,,	9 22 47·1	9 24	K
	I.	Tr. egr. bisection	,,	10 39 19·5	10 43	,,
		,, last contact	,,	10 41 19·2		
,, 7.	III.	Sh. egr. last seen	10-ft. tel.	10 57 37·0	11 5	,,
,, 12.	II.	Ecl. reap. first seen	with power 150	10 15 34·9	10 21 54·5	L
		,, fully seen	,,	10 16 12·8		
,, 16.	I.	Tr. ingr. first contact	Heliom.	12 0 6·1	12 6	K
		,, bisection	with power 200	12 2 35·7		
		,, last contact	,,	12 5 35·2		
,; 18.	I.	Tr. egr. first contact	,,	8 43 16·8	8 51	,,
		,, bisection	,,	8 45 16·5		
		,, last contact	,,	8 47 16·2		

1874MNRAS..34..416.

Day of Obs.	Satellite.	Phenomena.	Instrument and Power used.	Oxford Mean Solar Time of Observation. h m s	Greenwich Mean Solar Time from N.A. h m s	Observer.
1874.						
June 1.	III.	Ecl. dis. Began to fade in brightness	10-ft. tel.	10 3 6·0	10 9 47·3	K
		„ final dis.	with power 150	10 8 25·1		
	I.	Tr. ingr. first contact	„	10 10 4·9	10 18	„
		„ bisection	„	10 13 4·4		
		„ last contact	„	10 16 3·9		
„ 4.	II.	Tr. egr. first contact	Heliom.	9 52 55·9	9 56	„
		„ bisection	with power 200	9 55 25·5		
		„ last contact	„	9 57 55·1		
„ 8.	III.	Occ. dis. first contact	10-ft. tel.	8 43 14·6	8 50	„
		„ bisection	with power 150	8 47 13·9		
		„ last contact	„	8 51 13·2		
„ 9.	I.	Occ. dis. first contact	„	9 13 35·1	9 21	L
		„ last contact	„	9 17 24·5		
„ 11.	II.	Tr. egr. first contact	„	9 42 44·7	9 48	K
		„ bisection	„	9 45 44·2		
		„ last contact	„	9 49 43·5		
„ 13.	II.	Ecl. reap. first seen	Heliom. with power 200	10 1 54·0	10 7 36·3	„
		„ full brightness		10 4 8·6		

Notes.

Jan. 30. J. IV. Ecl. disapp. *Jupiter* and the satellites were very well defined. The satellite faded in brightness to a very small point of light, and disappeared suddenly at the time noted.

Mar. 7. The observation difficult, as the satellite disappeared close to the planet, and, before disappearing, became an extremely faint point of light.

„ 9. J. II. Occ. reapp. Doubtful; cloudy. J. I. Occ. reapp. The observation good.

„ 24. The planet was well defined and steady. (B.)

„ 25. J. II. and III. Trs. egress, and J. I. Ecl. reapp. The planet very tremulous.

„ 26. The planet very tremulous.

Apr. 24. Cloudy at both phenomena.

„ 25. The planet tremulous.

May 2. J. I. Trs. ingress. The planet very tremulous. J. I. Sh. Ingress. The shadow was well on the disc when "first seen."

„ 7. The sky became cloudy immediately after the time noted for "last seen."

„ 16. The image of the planet bad.

June 1. J. III. Ecl. disapp. The satellite became the merest point of light before finally disappearing.

„ 4. The image of planet bad.